

We claim:

1. A multimetal oxide of the formula I



where M is a metal selected from the group consisting of Li, Na, K, Rb, Cs, Tl, Mg, Ca, Sr, Ba, Cu, Zn, Cd, Pb, Cr, Au, Al, Fe, Co, Ni and/or Mo,

a is from 0.3 to 1.9 and

b is from 0 to 0.5, with the proviso that the difference  $(a-b) \geq 0.1$  and

c is from 0 to 20 and

x is a number determined by the valence and amount of elements different from oxygen in the formula I,

which has a crystal structure giving an X-ray powder diffraction pattern which displays reflections at the lattice spacings d of  $15.23 \pm 0.6$ ,  $12.16 \pm 0.4$ ,  $10.68 \pm 0.3$ ,  $3.41 \pm 0.04$ ,  $3.09 \pm 0.04$ ,  $3.02 \pm 0.04$ ,  $2.36 \pm 0.04$  and  $1.80 \pm 0.04$  Å.

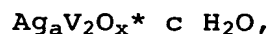
2. A multimetal oxide as claimed in claim 1 which has a fibrous crystal morphology having a mean ratio of fiber diameter to fiber length of less than 0.6.

3. A multimetal oxide as claimed in claim 1 which has a specific surface area determined by the BET method of from 3 to 250 m<sup>2</sup>/g.

4. A multimetal oxide as claimed in claim 1 in which a is from 0.5 to 1.0, b is from 0 to 0.3 and c is from 0 to 5.

5. A multimetal oxide as claimed in claim 1 in which a is from 0.6 to 0.9, b is from 0 to 0.1 and c is from 0 to 1.

6. A multimetal oxide as claimed in claim 1 and having the formula



where a is from 0.6 to 0.9, x is as defined in ~~claim 1~~ and c is from 0 to 5.

- 10 7. A multimetal oxide as claimed in claim 1 whose X-ray powder diffraction pattern displays the following 17 reflections at the specified lattice spacings d [Å]:

	Reflections	d [Å]
15	1	15.23 ± 0.6
	2	12.16 ± 0.4
	3	10.68 ± 0.3
	4	5.06 ± 0.06
	5	4.37 ± 0.04
20	6	3.86 ± 0.04
	7	3.41 ± 0.04
	8	3.09 ± 0.04
	9	3.02 ± 0.04
	10	2.58 ± 0.04
25	11	2.48 ± 0.04
	12	2.42 ± 0.04
	13	2.36 ± 0.04
	14	2.04 ± 0.04
	15	1.93 ± 0.04
30	16	1.80 ± 0.04
	17	1.55 ± 0.04

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8. A multimetal oxide as claimed ~~in claim 7~~ whose reflections 1 to 17 have the following approximate relative intensities ( $I_{rel}$  [%]):

5	Reflections	$I_{rel}$ [%]
	1	16
	2	11
	3	18
	4	11
10	5	23
	6	16
	7	80
	8	61
	9	100
15	10	23
	11	24
	12	23
	13	38
	14	26
	15	31
20	16	43
	17	36

9. A process for preparing multimetal oxides as claimed in ~~claim 1~~, which comprises heating vanadium pentoxide suspended in a liquid with a solution of a silver salt, with or without addition of a salt of the metal M, and isolating the product.
10. A process as ~~claimed~~ in claim 9, wherein the liquid used is water.
11. A process as claimed in ~~claim 9~~, wherein the multimetal oxide is isolated by spray drying or filtering off and drying.
12. The use of multimetal oxides as claimed ~~in claim 1~~ for producing precatalysts and catalysts for the ~~gas-phase~~ partial oxidation of aromatic hydrocarbons.
13. A precatalyst for producing coated catalysts for the gas-phase partial oxidation of aromatic hydrocarbons by means of a gas comprising molecular oxygen, comprising an inert, nonporous support material and one or more layers applied thereto in the form of a shell or shells, wherein this/these shell-like layer or layers comprises/comprise a multimetal oxide as claimed ~~in claim 1~~.

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a1  
5 14. A precatalyst as claimed in claim 13 which comprises from 30 to 100% by weight of a multimetal oxide as claimed in claim 1, based on the total weight of the layer or layers applied in the form of a shell or shells.

15. A precatalyst as claimed in claim 13 whose inert, nonporous support material comprises steatite.

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10 16. A precatalyst as claimed in claim 13 whose shell-like layer comprises from 30 to 100% by weight, based on the total weight of this layer, of a multimetal oxide as claimed in claim 2.

15 17. A precatalyst as claimed in claim 13 whose shell-like layer comprises from 30 to 100% by weight of a multimetal oxide as claimed in claim 3.

20 18. A precatalyst as claimed in claim 13, whose shell-like layer comprises from 30 to 100% by weight, based on the total weight of this layer, of a multimetal oxide as claimed in claim 6.

25 19. A coated catalyst for the gas-phase partial oxidation of aromatic hydrocarbons by means of a gas comprising molecular oxygen, comprising a catalyst support comprising an inert, nonporous support material and, applied thereto, one or more layer or layers comprising a catalytically active composition which comprises, based on its total weight, from 30 to 100% by weight of one or more silver-vanadium oxide bronzes having  
30 an Ag : V atomic ratio of from 0.15 to 0.95 and has a BET surface area of from 2 to 100 m<sup>2</sup>/g.

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35 20. A coated catalyst as claimed in claim 19 which has been produced using a multimetal oxide as claimed in claim 1.

21. A coated catalyst as claimed in claim 19 which has been produced from a precatalyst as claimed in claim 13.

40 22. A process for preparing carboxylic acids and/or carboxylic anhydrides by partial oxidation of aromatic hydrocarbons in the gas phase by means of a gas comprising molecular oxygen at elevated temperature over a catalyst whose catalytically active composition is applied in the form of a shell to a catalyst support comprising an inert, nonporous support material, wherein the catalyst used is a coated catalyst  
45 whose catalytically active composition, based on its total weight, comprises from 30 to 100% by weight of one or more

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silver-vanadium oxide bronzes having an Ag:V atomic ratio of from 0.15 to 0.95 and has a BET surface area of from 2 to 100 m<sup>2</sup>/g, in the presence or absence of at least one coated catalyst for the oxidation of aromatic hydrocarbons to carboxylic acids and/or carboxylic anhydrides which is different from the above-described coated catalyst and whose catalytically active composition comprises vanadium pentoxide and anatase as significant catalytically active constituents and, if such a second coated catalyst is present, it is used in a combined catalyst bed with the coated catalyst of the above composition in the oxidation reactor.

23. A process as claimed in claim 22, wherein use is made of a coated catalyst whose catalytically active composition, based on its total weight, comprises from 30 to 100% by weight of a silver-vanadium oxide bronze having an Ag:V atomic ratio of from 0.15 to 0.95 and has a BET surface area of from 2 to 100 m<sup>2</sup>/g and which has been produced in situ in the oxidation reactor from a precatalyst as claimed in claim 13.

24. A process as claimed in claim 22, wherein the coated catalyst used in a first catalyst bed located toward the gas inlet end of the oxidation reactor is a coated catalyst whose catalytically active composition comprises, based on its total weight, from 30 to 100% by weight of a silver-vanadium oxide bronze having an Ag:V atomic ratio of from 0.15 to 0.95 and has a BET surface area of from 2 to 100 m<sup>2</sup>/g and the coated catalyst used in a subsequent catalyst bed located toward the gas outlet end of the oxidation reactor is a coated catalyst for the oxidation of aromatic hydrocarbons to carboxylic acids and/or carboxylic anhydrides whose catalytically active composition comprises vanadium pentoxide and anatase as significant constituents.

25. A process as claimed in claim 22, wherein, as aromatic hydrocarbons, o-xylene or naphthalene or mixtures of o-xylene and naphthalene are oxidized to phthalic anhydride.

26. A process as claimed in claim 22, wherein, as aromatic hydrocarbon, toluene is oxidized to benzoic acid.